Beam and Primary Vertex Position Study for 120 and 58 GeV/c beam on Carbon target

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-120 and 58 GeV/c beam on Carbon target was used to analyze primary vertex position distribution

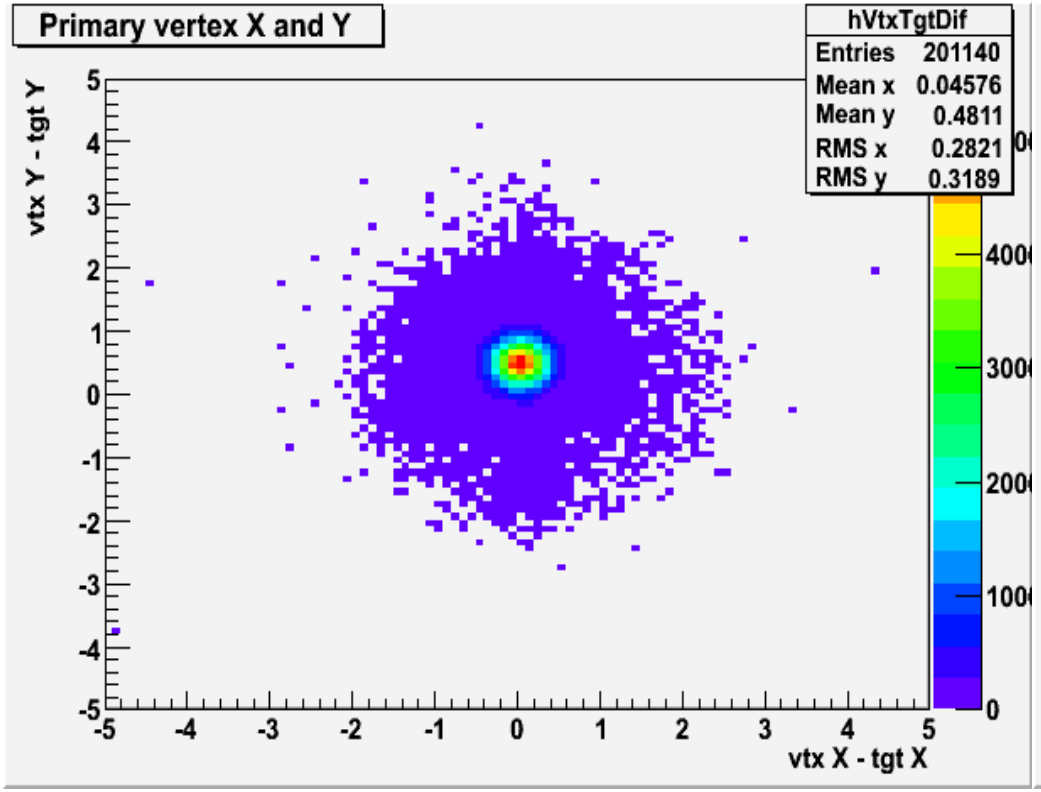
- Primary vertices with more than 1 outgoing track were selected

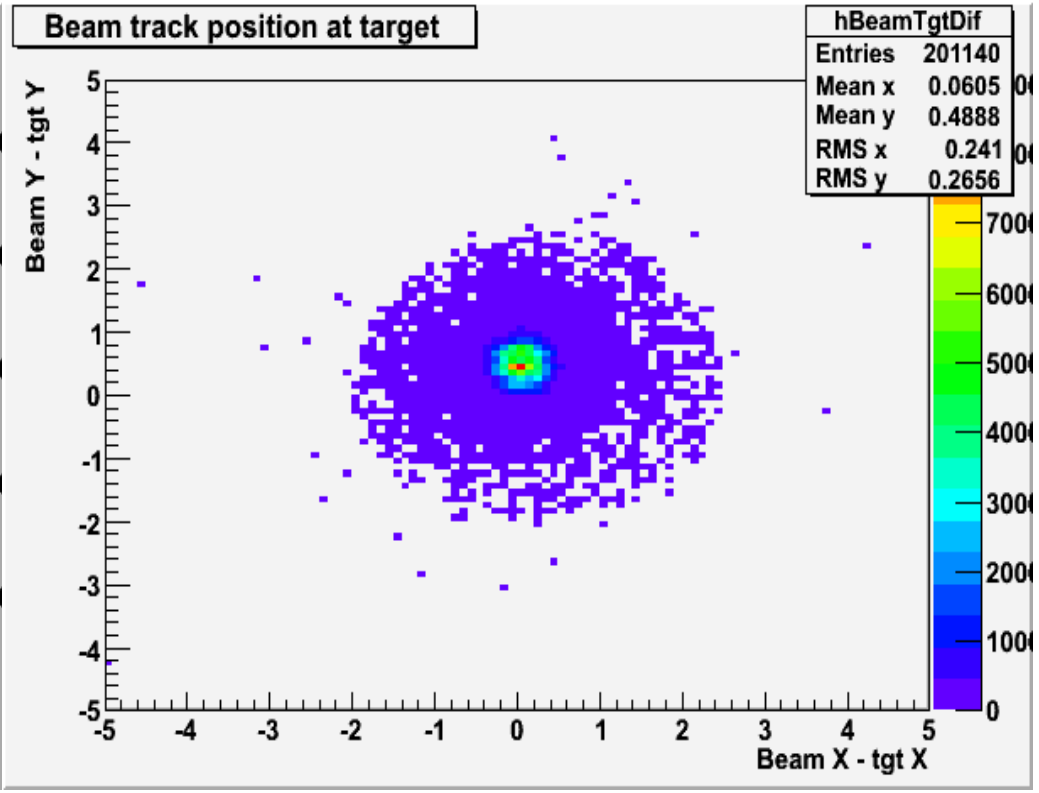
- Events with only one beam track were selected

- Beam tracks associated to the primary vertices were extrapolated to the target position and X and Y positions were plotted.

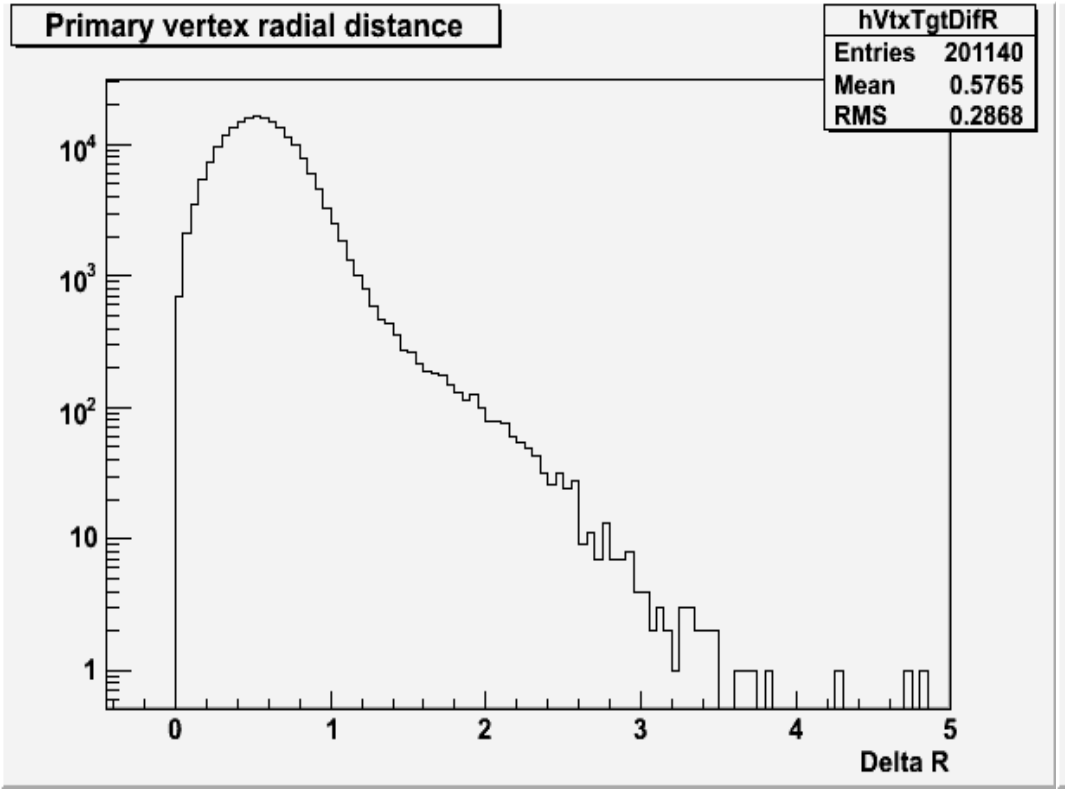
- The goal of the study to select events that beam tracks pass through the target ..

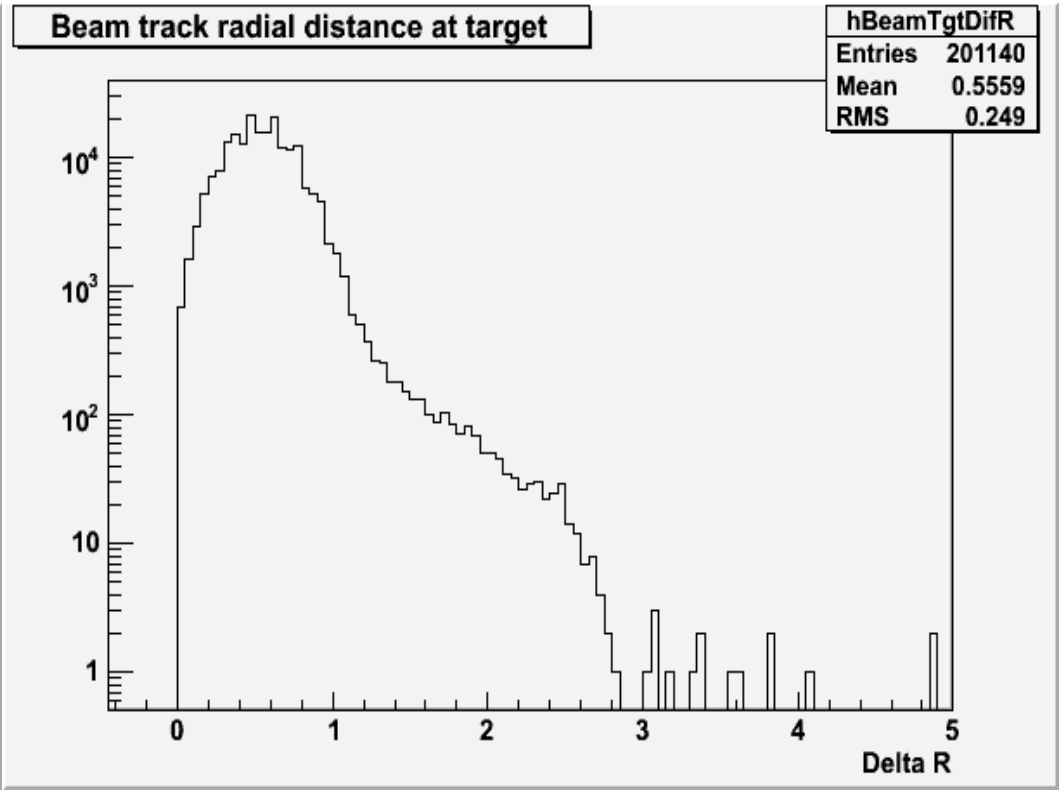
120 GeV/c proton beam on Carbon





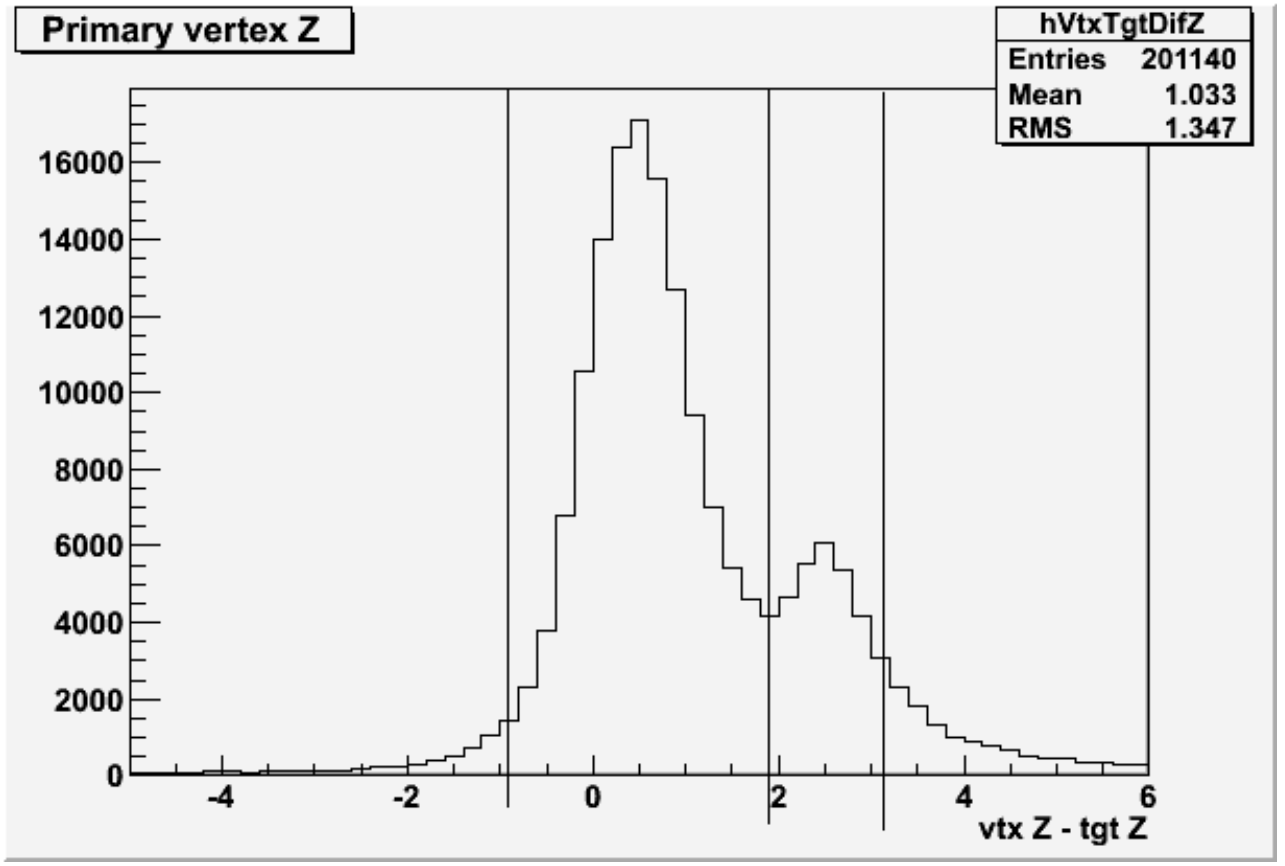
Radial Distance from target center



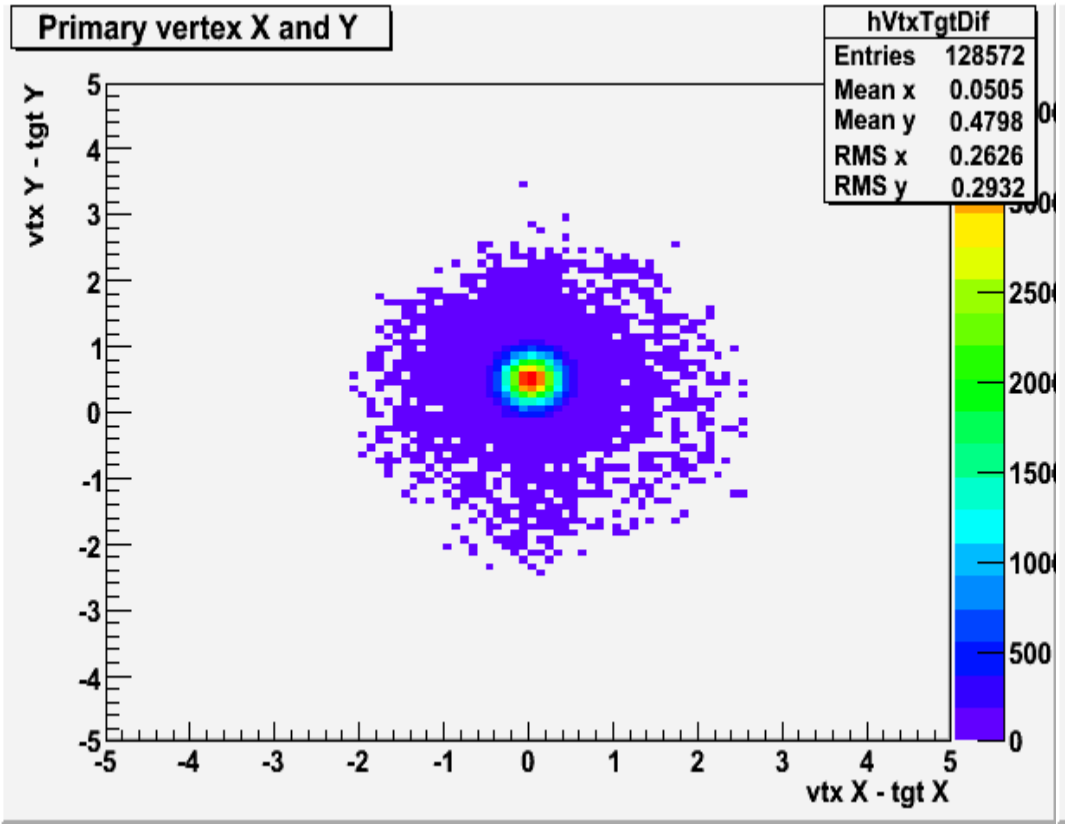


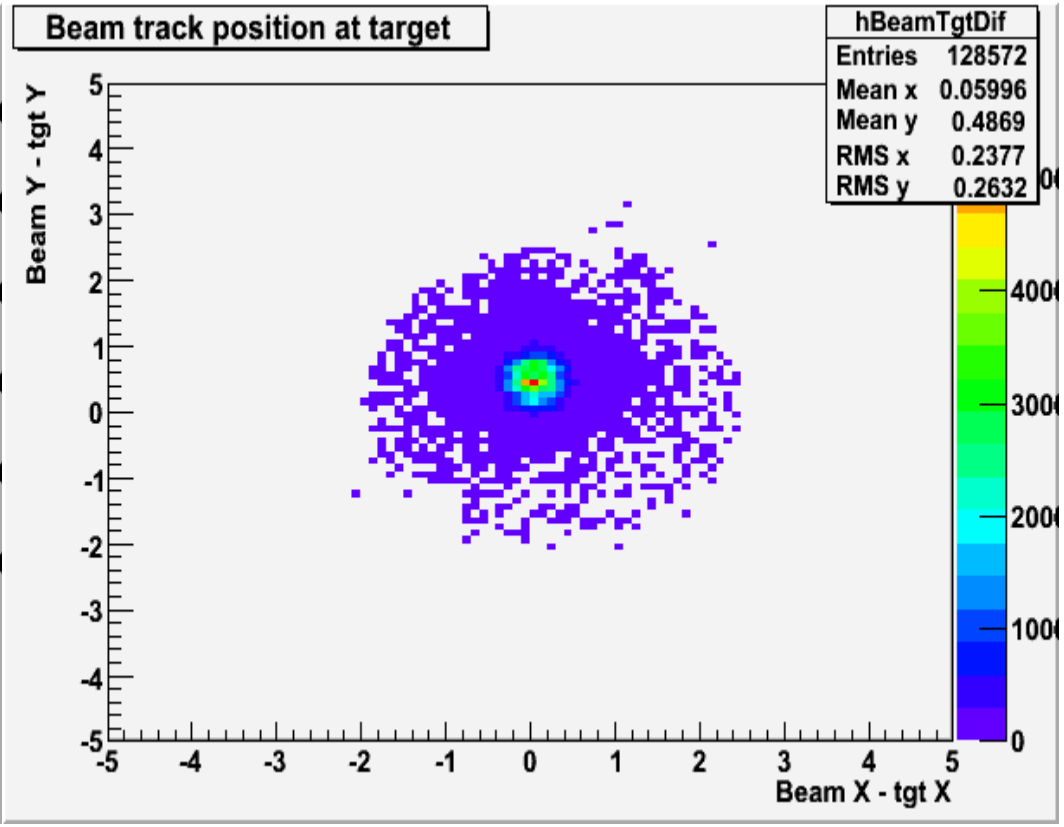
Target radius is 2.54 cm

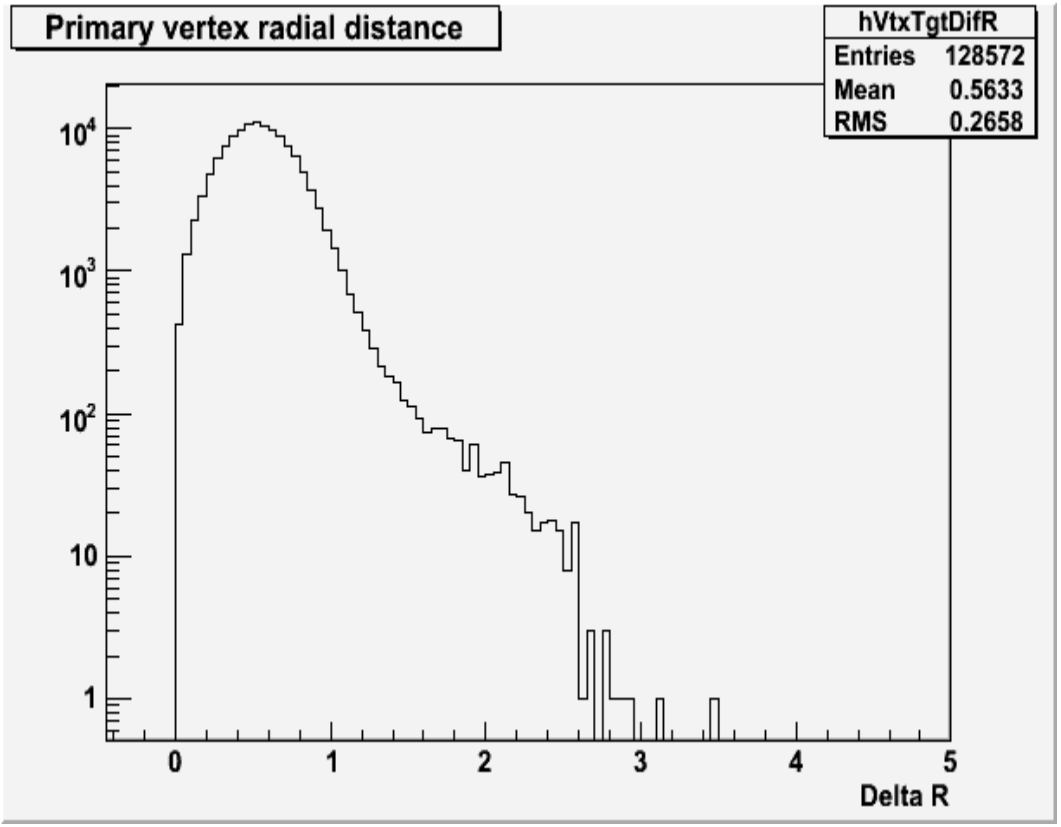
Primary vertex Z – Target Z

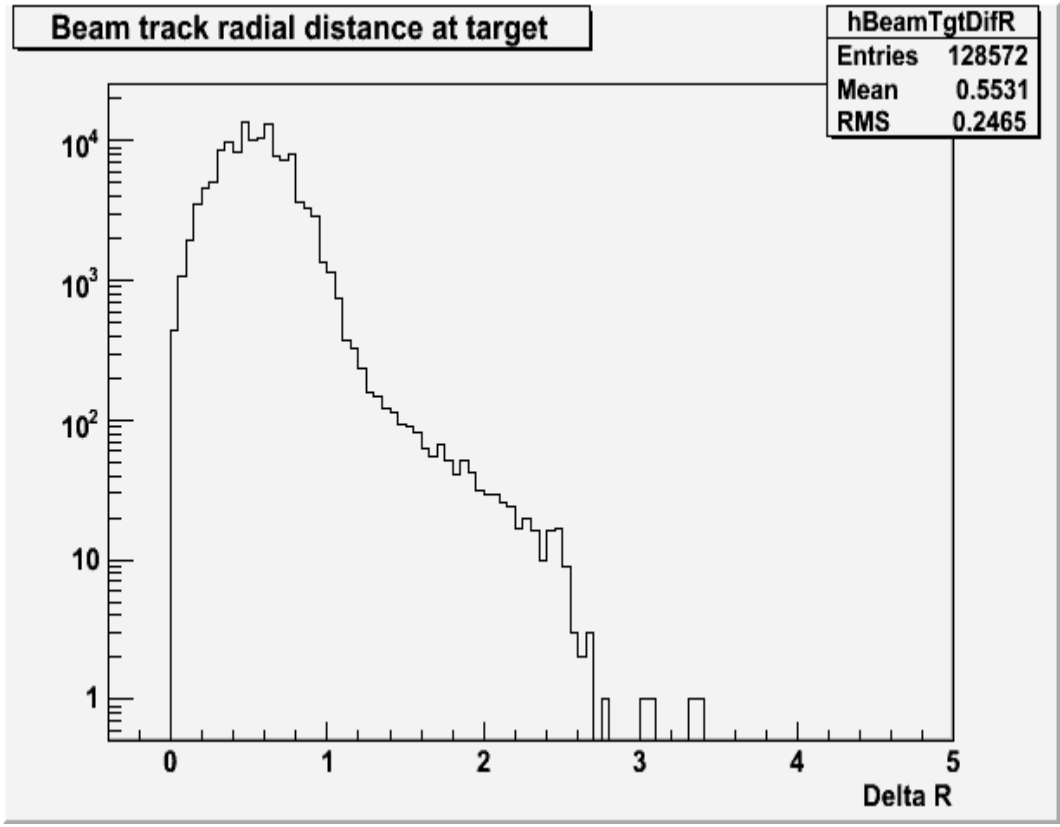


If we select primary vertices Z position difference from target Z between -0.9 and 1.9 cm to get target- like interactions:

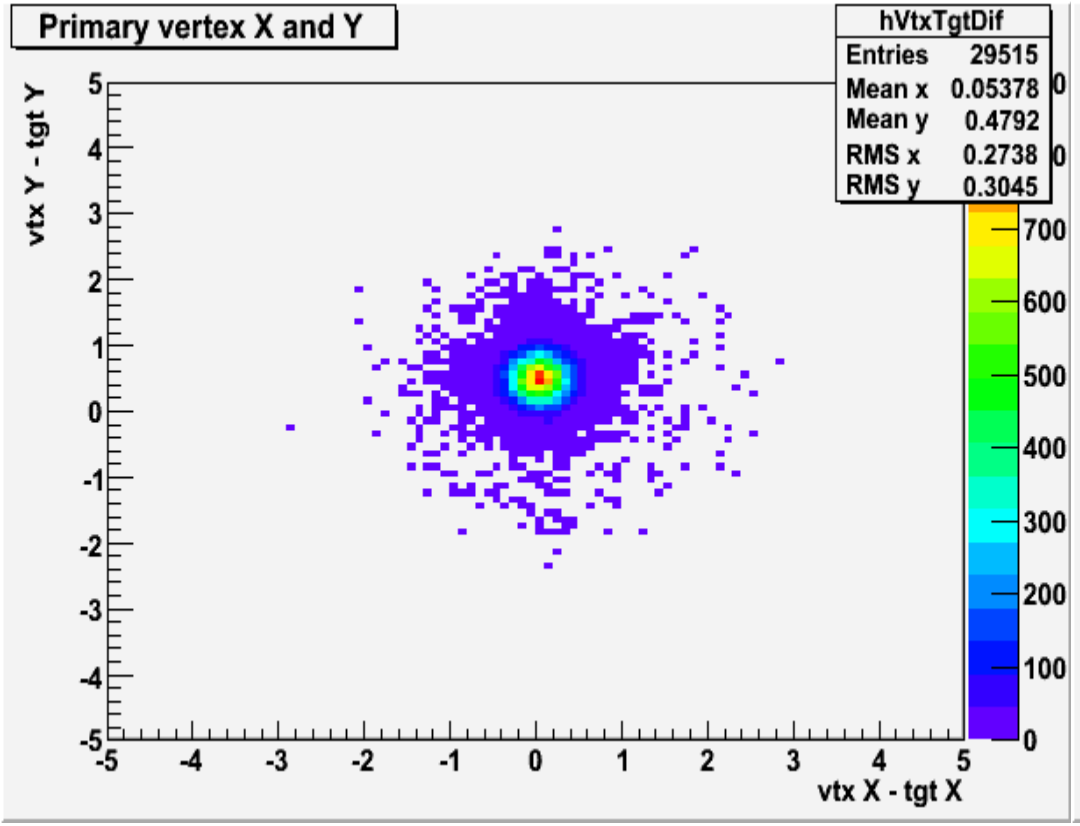


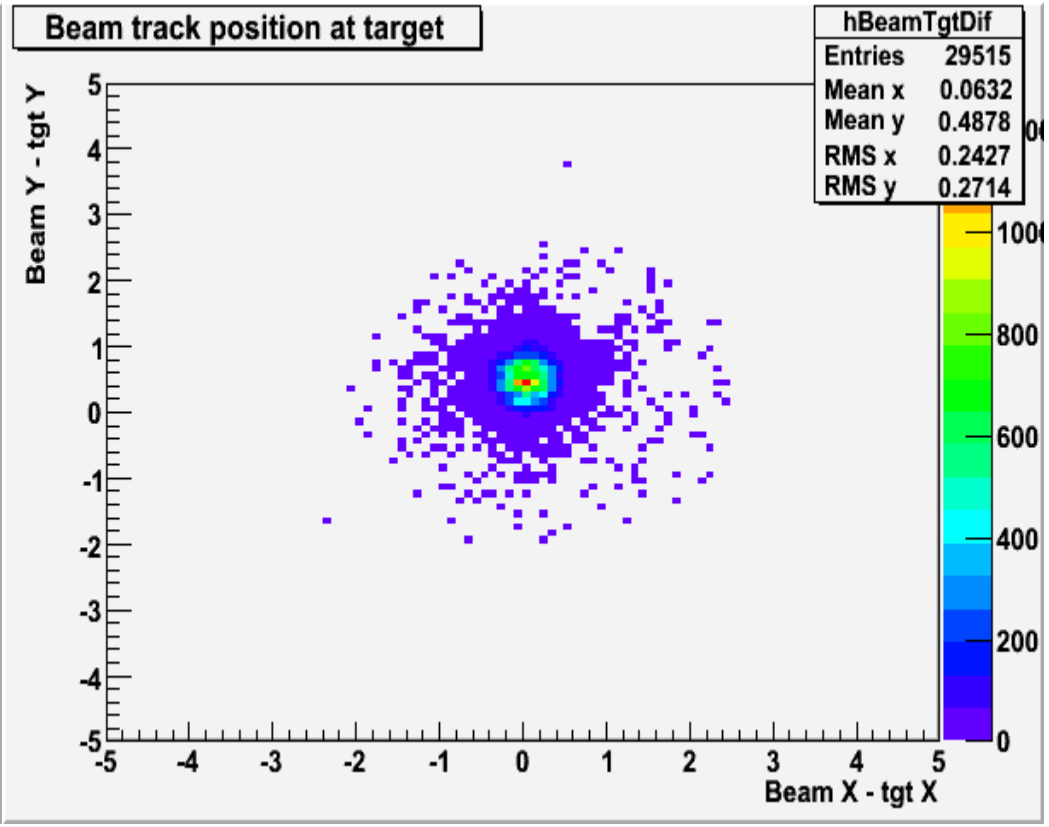


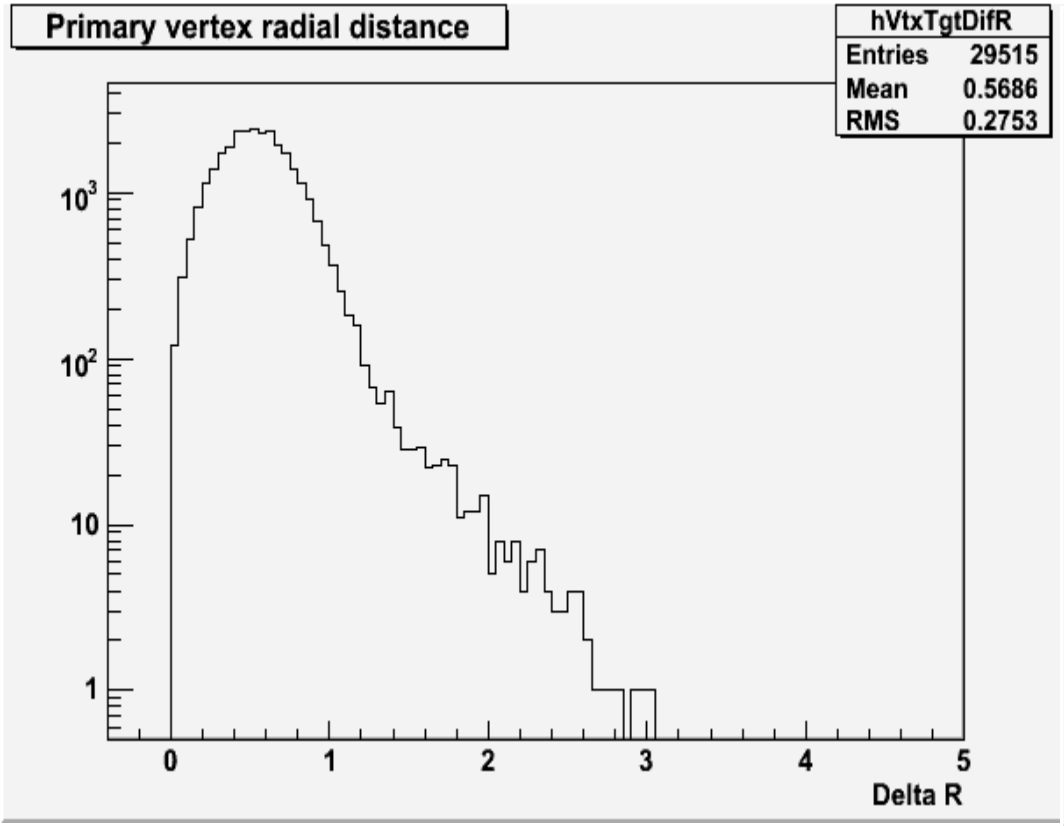

Primary vertex radial distance
hVtxTgtDifR
Entries 128572
Mean 0.5633
RMS 0.2658
10^4
10^3
10^2
10
1
0
1
2
3
4
5
Delta R

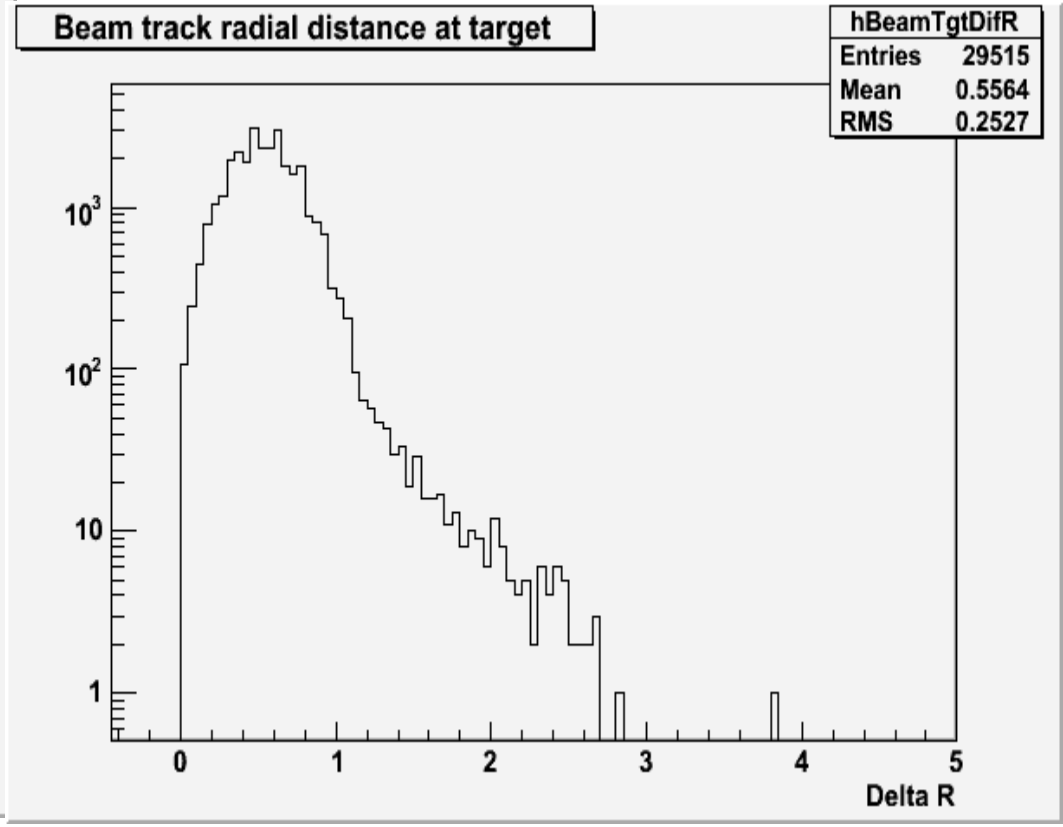

Beam track radial distance at target
hBeamTgtDifR
Entries 128572
Mean 0.5531
RMS 0.2465
10^4
10^3
10^2
10
1
0
1
2
3
4
5
Delta R

If we select primary vertices Z position difference between 1.9 and 3.1 cm to get scintillator interactions:

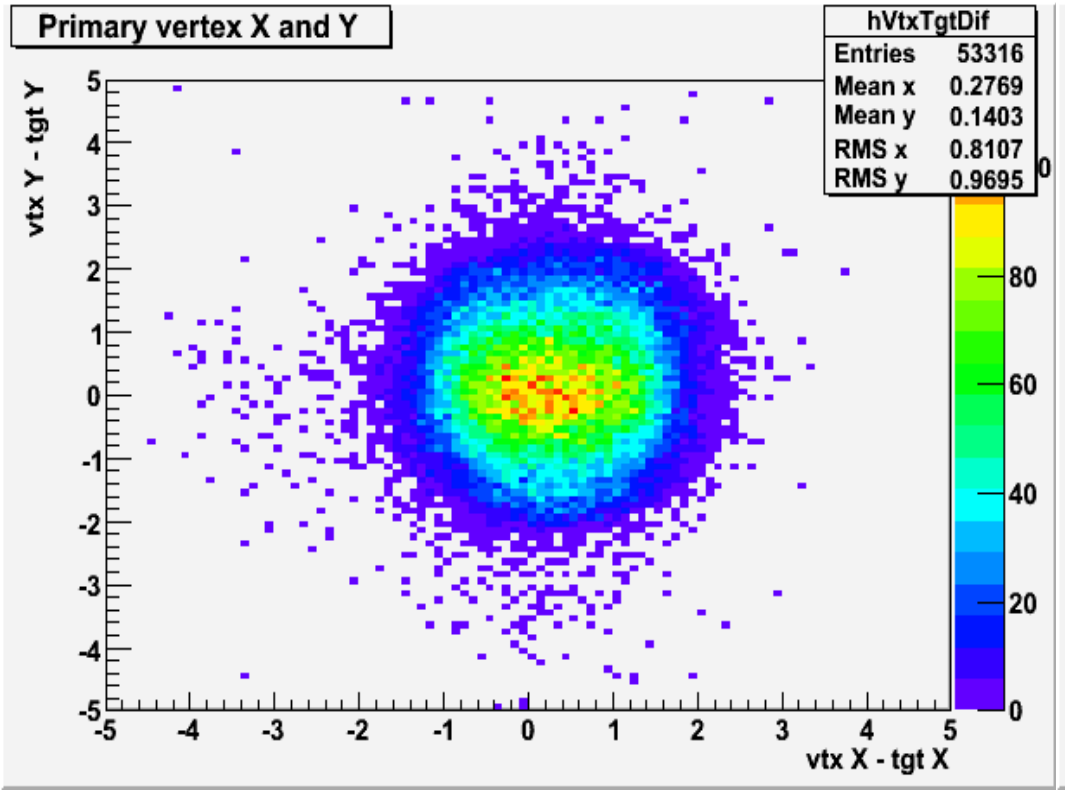


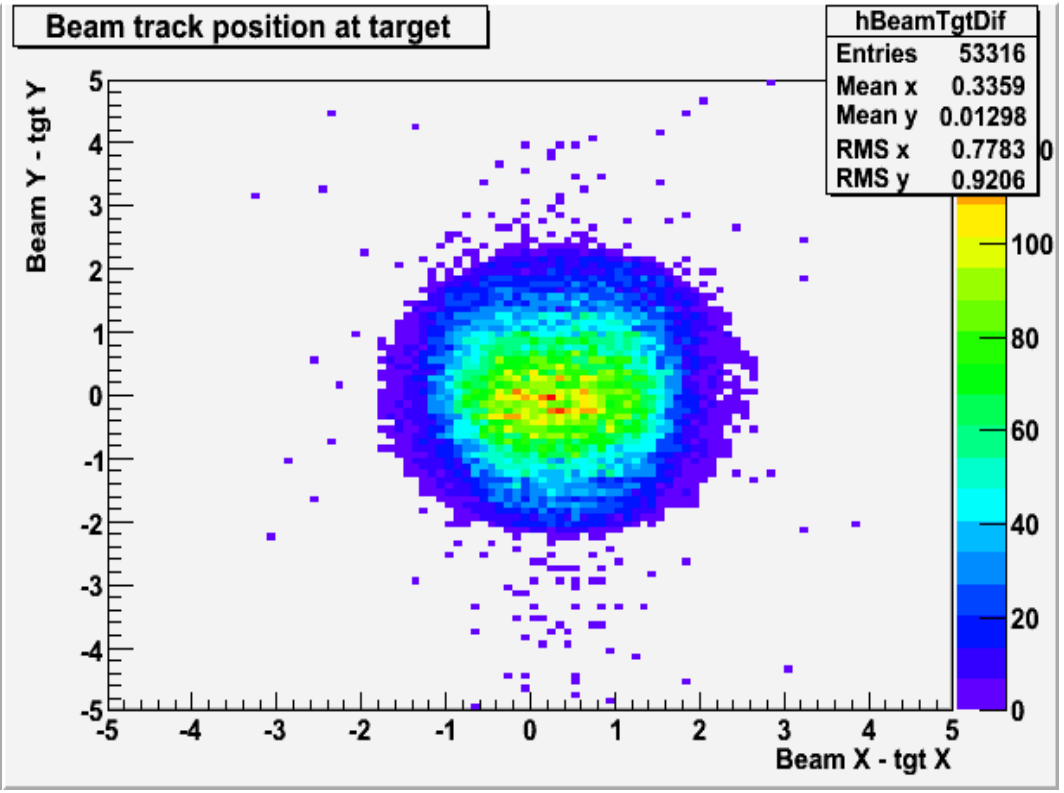


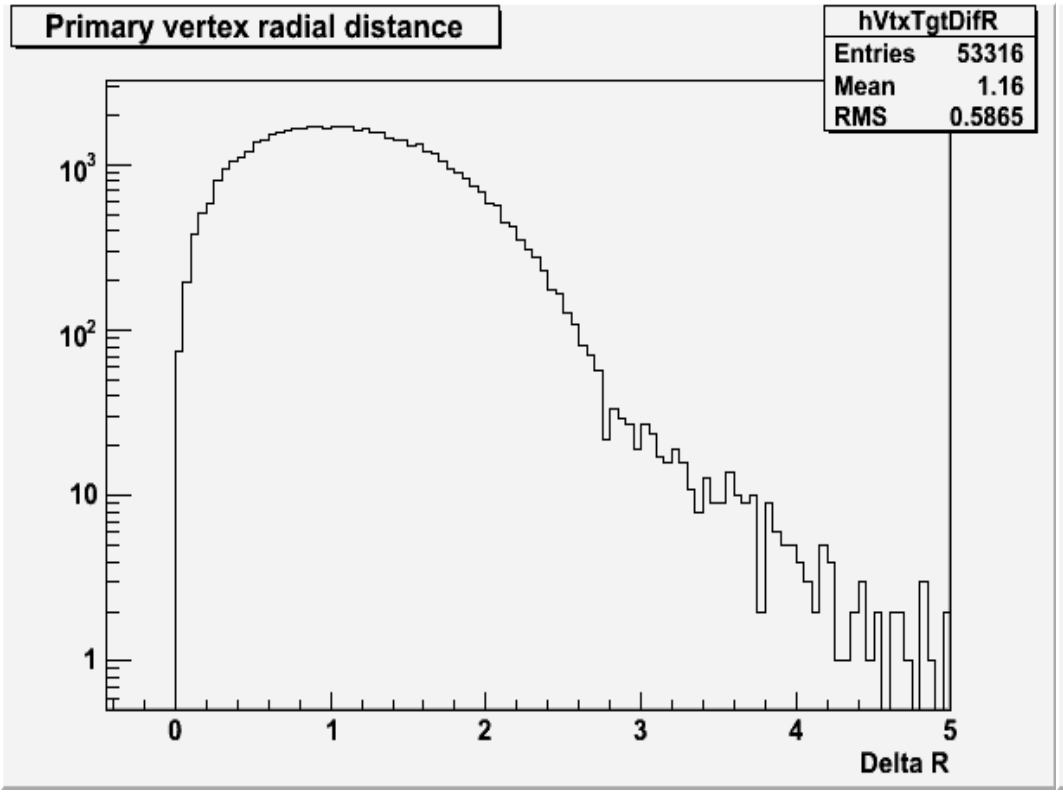

Primary vertex radial distance
hVtxTgtDifR
Entries 29515
Mean 0.5686
RMS 0.2753
10^3
10^2
10
1
0
1
2
3
4
5
Delta R

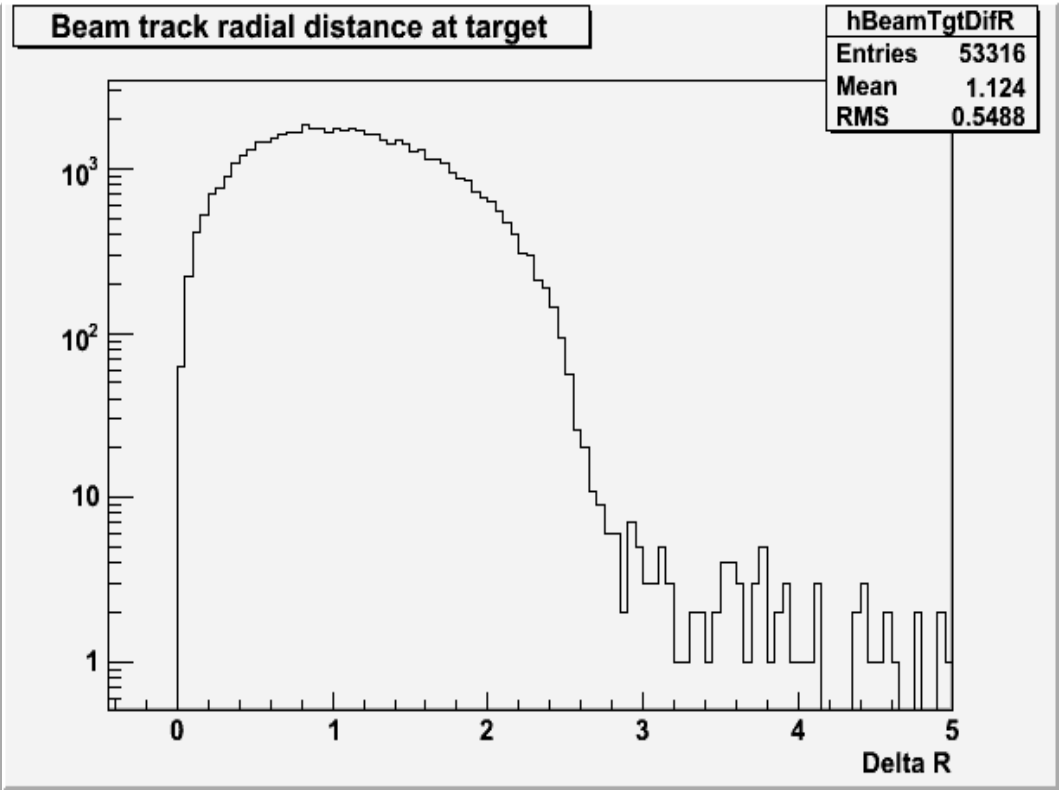

Beam track radial distance at target
hBeamTgtDifR
Entries 29515
Mean 0.5564
RMS 0.2527
10^3
10^2
10
1
0
1
2
3
4
5
Delta R

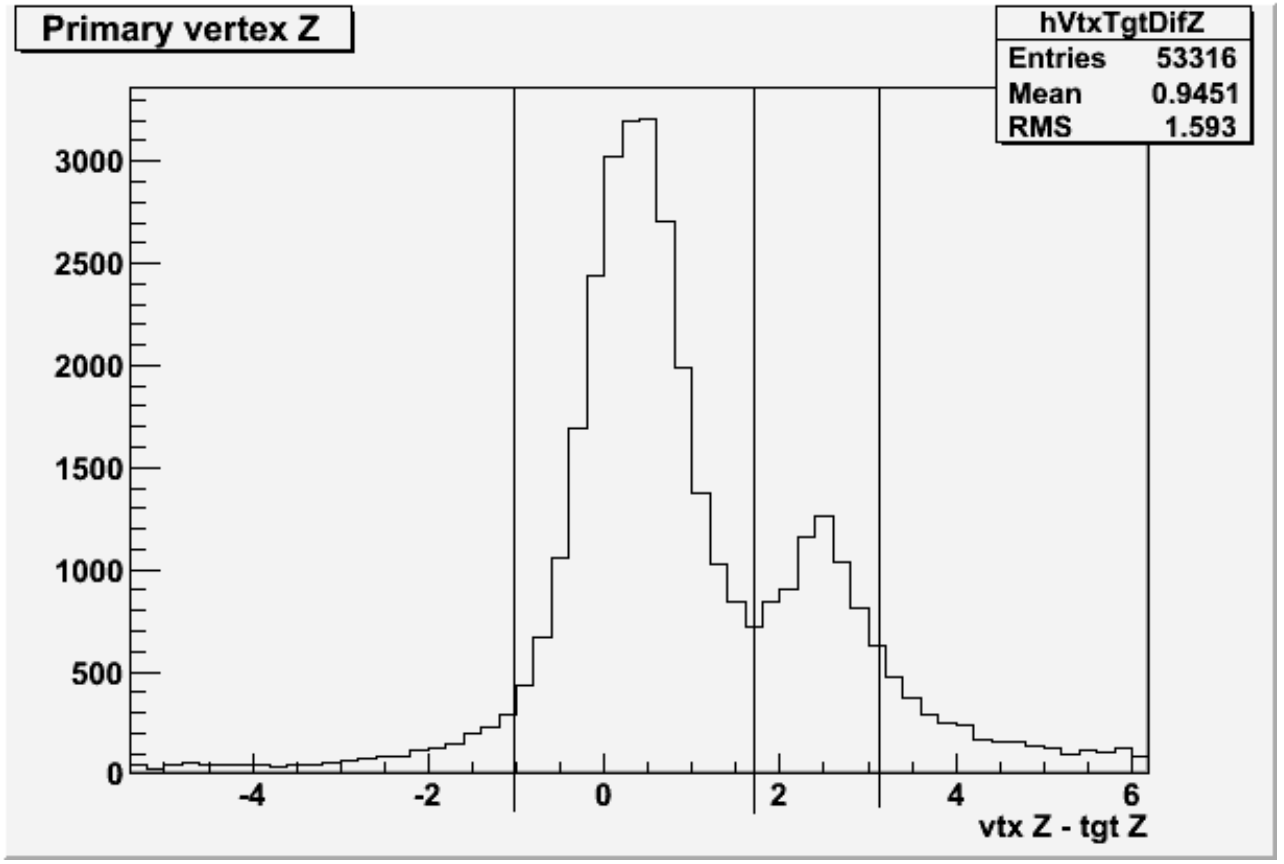
58 GeV/c Beam on Carbon



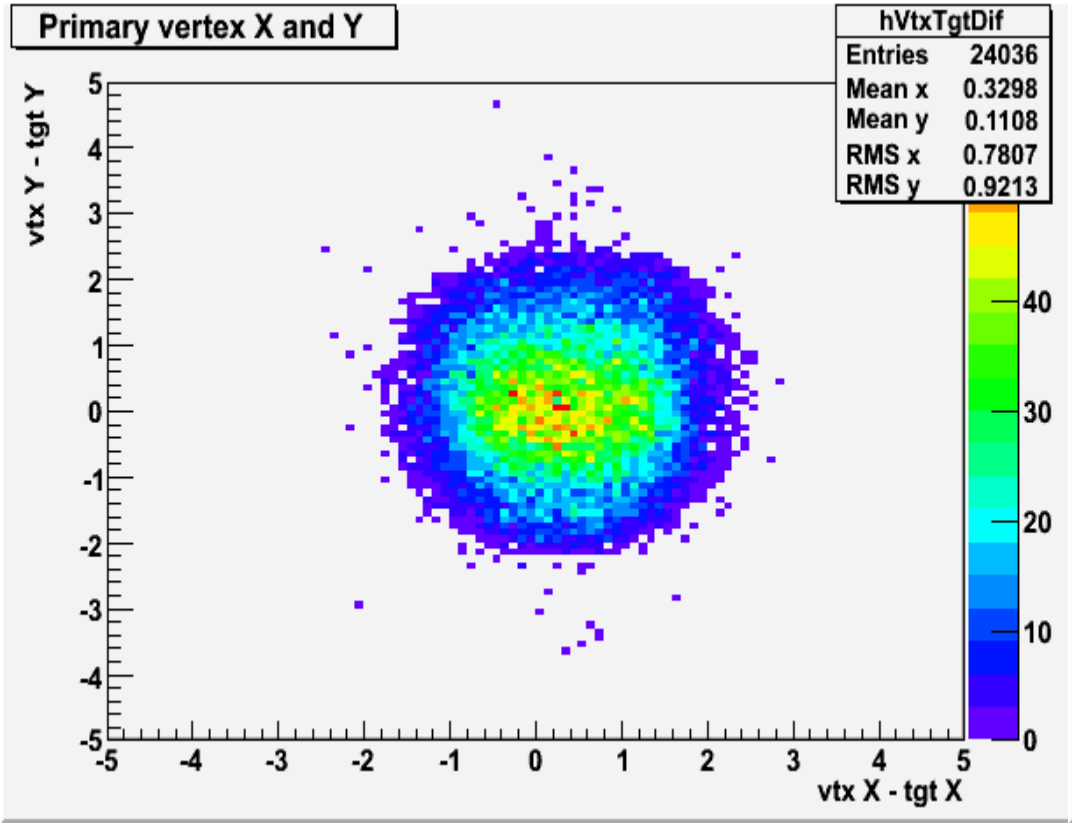


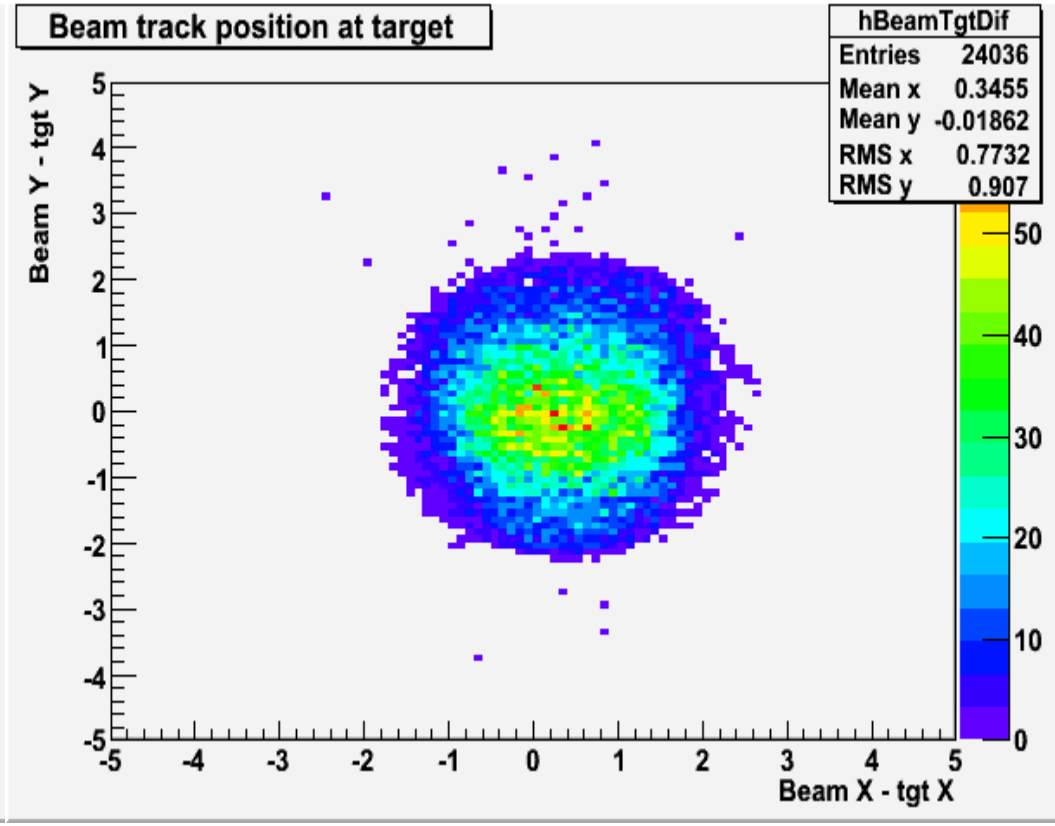

Primary vertex radial distance
hVtxTgtDifR
Entries 53316
Mean 1.16
RMS 0.5865
10^3
10^2
10
1
0
1
2
3
4
5
Delta R

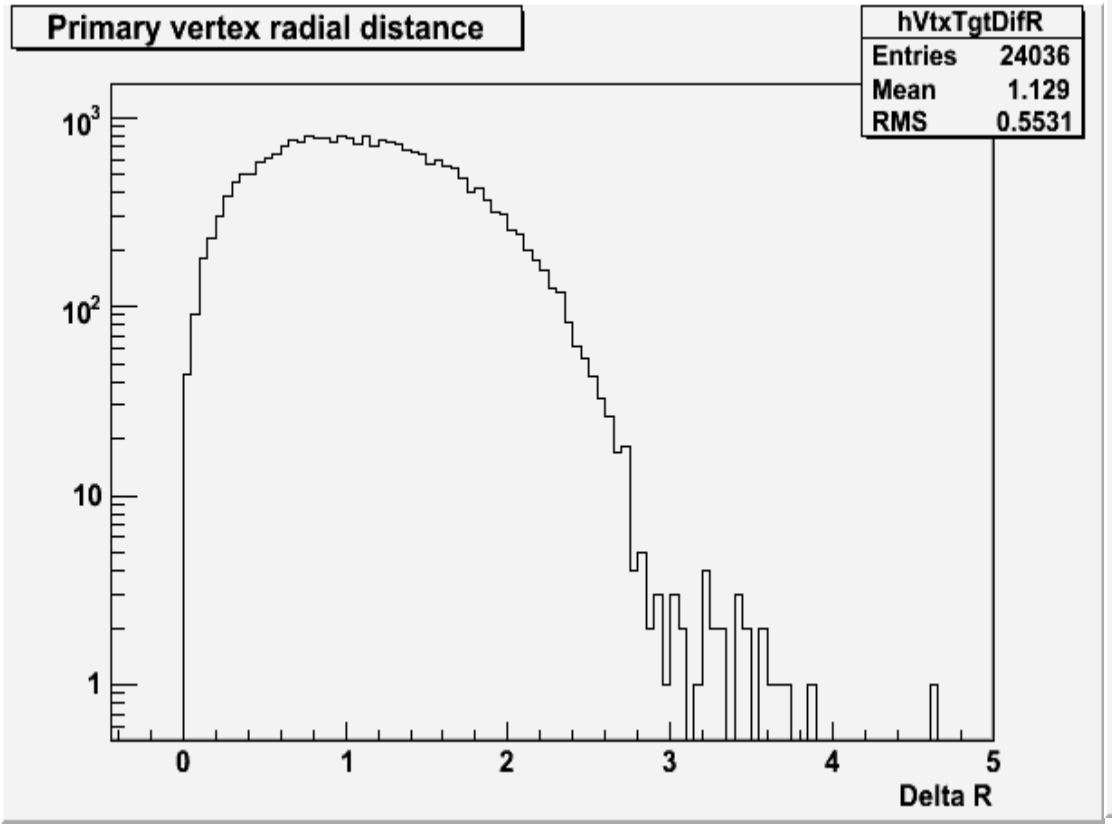

Beam track radial distance at target
hBeamTgtDifR
Entries 53316
Mean 1.124
RMS 0.5488
10^3
10^2
10
1
0
1
2
3
4
5
Delta R

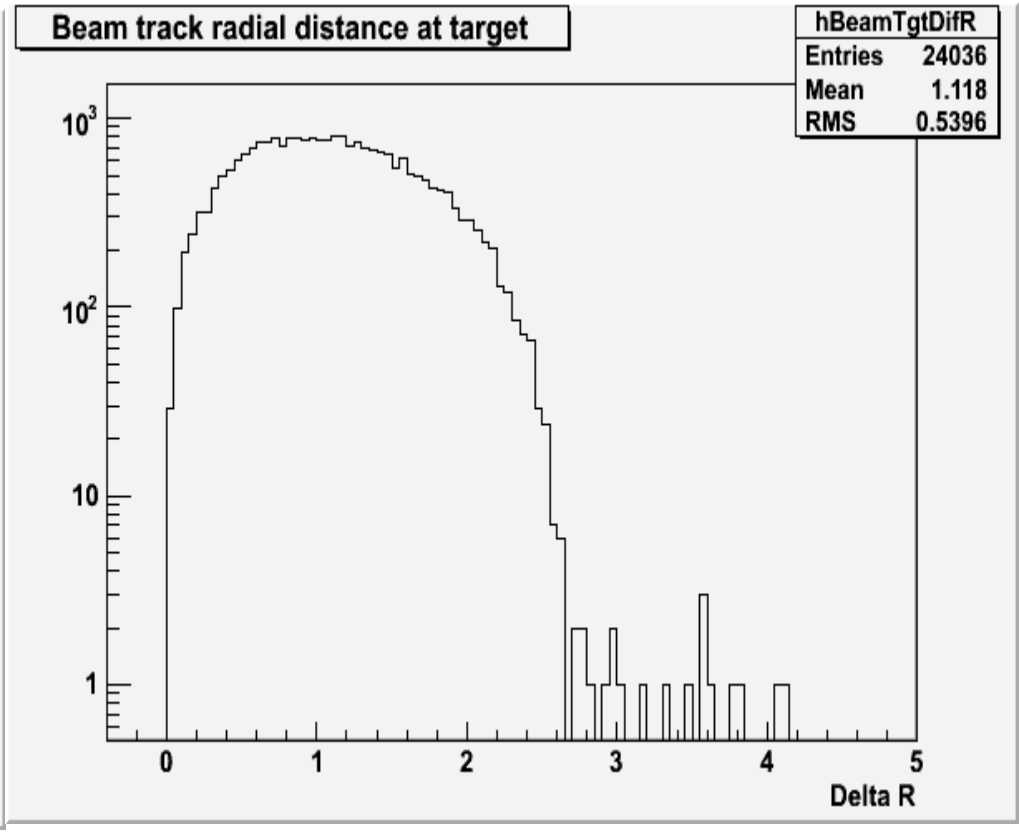

Primary vertex Z
hVtxTgtDifZ
Entries 53316
Mean 0.9451
RMS 1.593
3000
2500
2000
1500
1000
500
0
-4
-2
0
2
4
6
vtx Z - tgt Z

If we select primary vertices Z position difference between -1.0 and 1.7 cm to get target- like interactions:

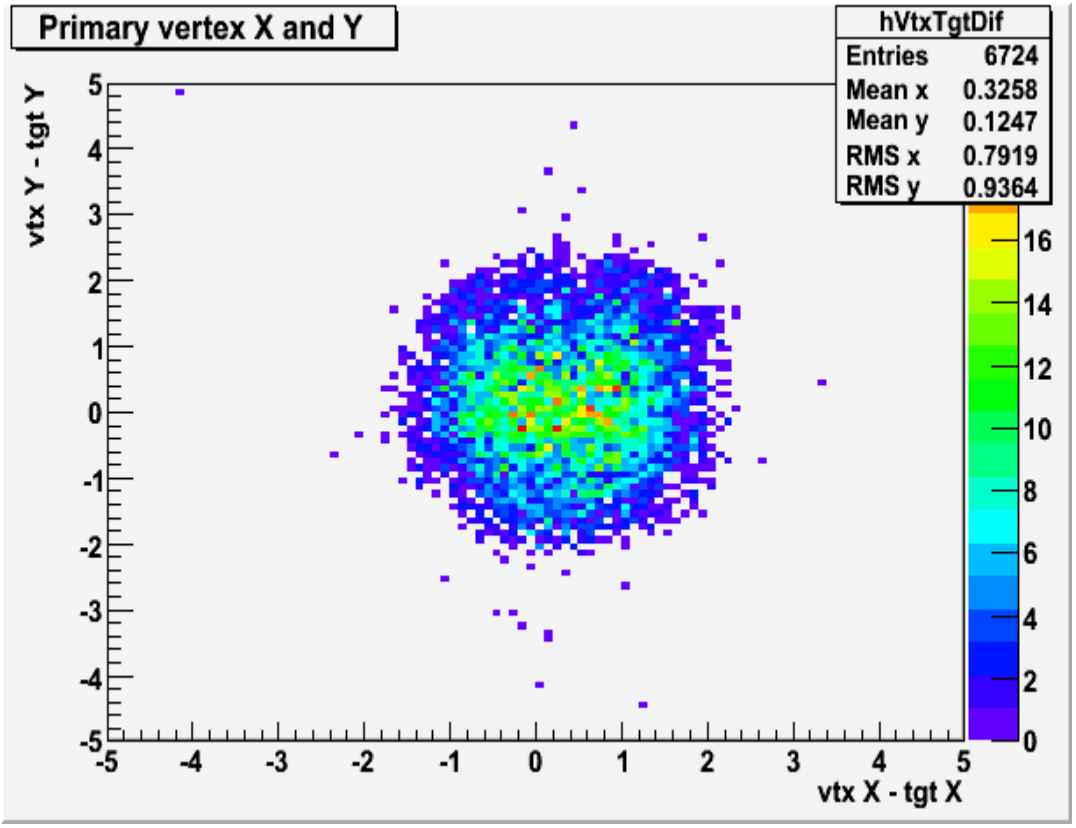


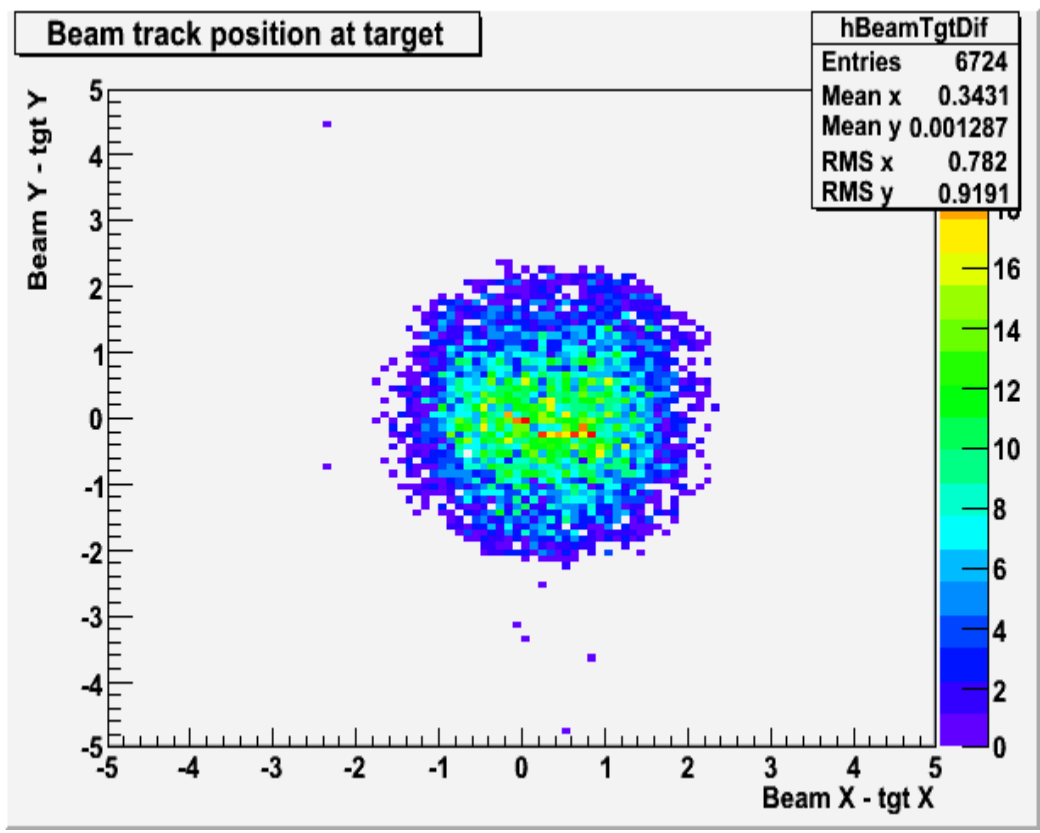



Primary vertex radial distance
hVtxTgtDifR
Entries 24036
Mean 1.129
RMS 0.5531
10^3
10^2
10
1
0
1
2
3
4
5
Delta R


Beam track radial distance at target
hBeamTgtDifR
Entries 24036
Mean 1.118
RMS 0.5396
10^3
10^2
10
1
0
1
2
3
4
5
Delta R

If we select primary vertices Z position difference between 1.7 and 3.1 cm to get scintillator interactions:





Radial distance from target center